

NEON LIGHT USING A ROPE LIGHT AS A LIGHT SOURCE

1 BACKGROUND OF THE INVENTION

2 1. Field of the Invention

3 The present invention relates to a neon light, and more particularly to a
4 neon light having therein a rope light as a light source to emit light such that the
5 waterproof capability of the neon light is improved.

6 2. Description of Related Art

7 With reference Fig. 6, a conventional neon light has a transparent or
8 translucent tube (1), a supporting bracket (2) having the tube (1) thereon, a
9 circuit board (3) received in the tube (1) and two end caps (4) to end cap two
10 open ends of the tube (1) to prevent water from seeping into the tube (1) to
11 damage the circuit board (3). The circuit board (3) has multiple light emitting
12 diodes (31) (LED) mounted thereon so that when the LED (301) are lit, the light
13 from the LED (301) is able to pass through the transparent or translucent tube (1)
14 to emanate a soft light. Because the material for the tube (1) is milky colored and
15 the LED (301) can be arranged to emit different colors, a colorful and soft visual
16 effect is thus created, which is very similar to a real neon light. However,
17 because the connection between the tube (1) and the supporting bracket (2), the
18 end caps (4) and the tube (1) and the circuit board (3) and the tube (1) are glued
19 together, waterproof capability of the conventional neon light is poor and the
20 circuit board (3) is very possible to be damaged by the seeping moisture. What is
21 more important is that after they are glued together, the assembly of the device
22 becomes quite inconvenient. U.S. Pat. No. 6,557,282; 6,158,882; 6,283,612 are
23 patents discussing different neon lights which are similar to the one described

1 above. That is, they all have the same problem of high production and
2 maintenance fee.

3 In U.S. Pat. No. 6,361,186, the LEDs are placed inside an opaque
4 chamber. A transparent tube is placed in front of the LEDs such that the light
5 from the LEDs is able to be scattered, refracted and reflected by the transparent
6 tube. The transparent tube is easily disassembled for repair so that the
7 maintenance fee is reduced. However, due to the consideration of easy assembly
8 of the transparent tube, the waterproof capability is thus sacrificed. Furthermore,
9 the application of the circuit board increases the manufacture cost.

10 To overcome the shortcomings, the present invention tends to provide an
11 improved neon light to mitigate the aforementioned problems.

12 **SUMMARY OF THE INVENTION**

13 The primary objective of the present invention is to provide an improved
14 neon light to greatly reduce the maintenance fee and increase the waterproof
15 capability of the neon light.

16 Another objective of the present invention is that a rope light is received
17 in a milky colored U-shaped cover so that the light from the rope light after
18 passing through the milky colored U-shaped cover is soft.

19 Still another objective of the present invention is that the base for
20 connecting to the milky colored U-shaped cover is opaque. Therefore, the light
21 from the LEDs is able to be totally reflected, refracted or scattered through the
22 milky colored U-shaped cover.

23 A further objective of the present invention is that the rope light has a
24 milky colored gel injection molded outside each one of the LEDs so that the

1 waterproof capability of the neon light of the present invention is high.

2 Other objects, advantages and novel features of the invention will
3 become more apparent from the following detailed description when taken in
4 conjunction with the accompanying drawings.

5 **BRIEF DESCRIPTION OF THE DRAWINGS**

6 Fig. 1 is an exploded perspective view of the neon light of the present
7 invention;

8 Fig. 2 is a perspective view of the neon light in Fig. 1 in assembly;

9 Fig. 3 is a schematic view showing the structure of the rope light used in
10 the neon light of the present invention;

11 Fig. 4 is an exploded perspective view of the converter in the rope light
12 in Fig. 3;

13 Fig. 5 is a schematic perspective view showing the inner structure of the
14 rope light; and

15 Fig. 6 is an exploded perspective view of a conventional neon light.

16 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

17 With reference to Figs. 1 and 2, the neon light in accordance with the
18 present invention includes a cover (5) and a rope light (6).

19 The cover (5) is composed of a translucent U-shaped cover (51) and a
20 base (52) corresponding and connected to a bottom of the U-shaped cover (51).

21 A ledge (511) is formed on two longitudinal sides of the U-shaped cover (51). A
22 rib (521) is formed on two longitudinal free sides of the two side walls of the
23 base (52) to correspond to the ledge (511). The two side walls (not numbered) are
24 respectively perpendicularly extended from a bottom face of the base (52) and an

1 arcuate seat (522) is longitudinally formed between the two side walls of the
2 base (52). One of the two side walls has two cutouts (523) oppositely defined in
3 two distal ends of the side wall. A recess (524) is formed on a joint of each of the
4 two side walls and the bottom face of the base (52) to correspond to a positioning
5 element (53). The positioning element (53) has two extensions (531) extending
6 outward to correspond to the two recesses (524) of the base (52).

7 An end cap (54) is provided to seal two open ends of the cover (5) after
8 the U-shaped cover (51) and the base (52) are assembled.

9 With reference to Fig. 3, the rope light (6) of the present invention has a
10 plug (61) with a power cord (611). A fast-release male connector (612) is formed
11 on the power cord (611) opposite to the plug (61). A fast-release female
12 connector (613) is provided to connect to the fast-release male connector (612)
13 and electrically connected to a converter (62) which is to convert alternate
14 current to direct current (AC-DC). The rope light (6) is provided with a milky
15 colored gel body (63) injection molded to enclose therein light emitting diodes
16 (64), wires (65) and resistor (66). At a distal end opposite to the plug (61), an end
17 cap (67) is injection molded at the distal end of the milky colored gel body (63).
18 A secondary cord (68) may be provided to electrically connect to the power cord
19 (611) and has a female connector (691) connected to a male connector (692)
20 which is formed on a distal end of the secondary cord (68) such that the user may
21 unscrew the female connector (691) for extension with another fast-release male
22 or female connector depending on the requirements.

23 With reference to Fig. 4, the converter (62) in Fig. 3 includes a circuit
24 board (621) and a casing (622) which is composed of an inner upper cap (6221),

1 an inner lower cap (6222), an outer upper cap (6223) and an outer lower cap
2 (6224). The circuit board (621) is electrically connected to the power cord (611).
3 Then the inner upper cap (6221) and the inner lower cap (6222) are connected to
4 each other to enclose therein the circuit board (621). Thereafter, the outer upper
5 cap (6223) and the outer lower cap (6224) are formed outside the inner upper cap
6 (6221) and the inner lower cap (6222) by injection molding so that the converter
7 (62) is completely waterproof.

8 With reference to Fig. 5, it is noted that the milky colored gel body (63)
9 is defined therein with a longitudinal channel (631). Multiple radially defined
10 notches (632) are defined in the milky colored gel body (63) to respectively
11 communicate with the longitudinal channel (631). With such an arrangement of
12 the longitudinal channel (631) and the notches (632), the LEDs (64) are
13 respectively received in a corresponding one of the notches (632) and the wires
14 (65) and the resistors (66) are received in the longitudinal channel (631). Thus,
15 the rope light of the present invention is resilient for folding and bending without
16 damaging the electrical connection between the LEDs (64), the wires (65) and
17 the resistors (66).

18 With reference to Figs. 1 and 2, when the neon light of the present
19 invention is in assembly, the rope light is first received in a space defined by the
20 base (52) and the U-shaped cover (51), wherein the ledges (511) are connected to
21 the ribs (521) to secure engagement between the U-shaped cover (51) and the
22 base (52). Thereafter, the power cord (611) may extend out of the cover (5) from
23 one of the cutouts (523) and the secondary cord (68) may extend out of the cover
24 from the other cutout (523). Then the positioning element (53) is connected to

1 the base (52) by inserting two extensions (531) which are formed on the
2 positioning element (53) into the two recesses (524) in the base (52) and the end
3 caps (54) are applied to seal the two open ends of the cover (5) to enclose therein
4 the rope light (6). Thereafter, the assembly of the neon light of the present
5 invention is completed.

6 It is noted that to further enhance the emission of the light from the
7 LEDs (64), it is recommended to place an opaque metal plate on a bottom face of
8 the arcuate seat (522) so that the light from the LEDs (64) can only emanate from
9 the U-shaped cover (51).

10 In conclusion, the neon light of the present invention is entirely
11 waterproof due to the injection molding of the milky colored gel body outside
12 the LEDs (64), the wires (65) and the resistors (66). Therefore, even the neon
13 light is applied in rainy days or in an environment with high humidity, the
14 circuitry of the rope light may still remain intact. Furthermore, because the
15 assembly of the present invention is easy, the manufacture cost is low.

16 It is to be understood, however, that even though numerous
17 characteristics and advantages of the present invention have been set forth in the
18 foregoing description, together with details of the structure and function of the
19 invention, the disclosure is illustrative only, and changes may be made in detail,
20 especially in matters of shape, size, and arrangement of parts within the
21 principles of the invention to the full extent indicated by the broad general
22 meaning of the terms in which the appended claims are expressed.